Math 31 – Workshop #8

---

1. (a) Compute $\dfrac{d}{dx}\,(x \sin x)$.

   (b) Explain how you can use the above equation to figure out $\displaystyle\int x \cos x \; dx$.

   (c) Compute $\dfrac{d}{dx}\Big(u(x) \cdot v(x)\Big)$.

   (d) Using the equation above, what does $\displaystyle\int u(x)v'(x) \; dx$ equal.

   (e) Use what you found above to compute $\displaystyle\int x(\sec^2 x) \; dx$.

   (f) Now redo the integral, $\displaystyle\int x(\sec^2 x) \; dx$, using the u, dv notation.

2. Compute the following integrals.

   (a) $\displaystyle\int_0^3 xe^{2x} \; dx$

   (b) $\displaystyle\int x \ln x \; dx$

   (c) $\displaystyle\int \frac{(\ln x)^2}{x} \; dx$

   (d) $\displaystyle\int x^3 \cos(x^2) \; dx$

   (e) $\displaystyle\int x \arctan x \; dx$